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Information disclosure in auctions: an experiment

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Abstract

We report experimental results on the importance of information disclosure policy in first-price sealed-bid auctions. Interaction takes place in 10 periods according to a random-matching protocol, and we control the level of information feedback bidders receive after each period. When bidders are informed about the losing bids in previous periods, prices are higher than the theoretical prediction. However, when this information is not revealed the bidding becomes more competitive, and the bids come close to the theoretical prediction. We suggest that a signaling phenomenon may be important for explaining these results. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

Details of market organization may influence economic performance. In many cases, these details are matters of choice for government procurement practices and government auctions (e.g. offshore oil leases, timber and grazing rights, or the broadcast spectrum). Similarly, in the private sector, the rise of electronic markets and auction sites has focused attention on the specifics of market organization. In this paper, we report experimental evidence concerning how one particular detail affects competition in first-price auctions: the availability of information about historic bids submitted in previous auctions. We consider three possible forms of information disclosure where in turn all bids, all winning bids, or no bids at all are announced by the auctioneer at the completion of an auction.

The core feature of the design is the following game: each of two players simultaneously chooses a bid, which is an integer between 2 and 100. The player who chooses the lowest

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bid gets a dollar amount times the number(s) he bids and the other player gets 0 (ties are split). This game may be interpreted as a first-price auction where the (common) value of the auctioned object is known. With this interpretation, a strategy measures the difference between the value of the object and the payment offered for it. For example, the bids could be profit levels or prices requested by two competing firms to perform some task desired by a government agency. This game has a unique Nash equilibrium in which each player submits a bid of 2 and gets a payoff of only 1 (times a dollar amount). This equilibrium is strict and it can be given a strong decision-theoretic justification since a bid of 2 is the unique rationalizable strategy (Bernheim, 1984; Pearce, 1984) of the game. [1]

We wish to investigate whether this sharp prediction stands up in a laboratory test. We are primarily interested in the behavior of experienced participants, since in many first-price auctions the participants are experienced. Hence, we must let participants play the game several times. The most common method for inducing experience in experimental economics is to let a fixed group of participants interact over and over again. However, a drawback with this approach is that a confounding effect is introduced: Since the same participants interact repeatedly, opportunities for cooperation of the kind studied in the theory of repeated games may be created (see Pearce, 1992 for a general overview). We wish to test the model described in the previous paragraph as it stands, and yet to allow for experience while avoiding repeated game effects. To achieve this, we use a random-matching scheme such that participants play the game 10 times, matched randomly with one out of eleven counterparts in each round. In the terminology of Jackson and Kalai (1997), our design approximates interaction in recurring games, as opposed to repeated ones.

The issue of information disclosure crops up when an auction is run many times. Since each bidder participates in more than one auction, a history of bids will exist. This history may or may not be public information. We use three treatments to investigate the importance of this issue. In the first treatment—full information—we publicly announce the entire vector of submitted bids at the end of each period. In the second treatment—semi-information—we announce only the winning bids, and in the third treatment—no information—we announce at the end of each period only which participant won. It is crucial to note that the theoretical prediction, described above, is invariant to the information condition.

In this paper, we emphasize the first-price auction interpretations, but the game we study may also be thought of in terms of price-competition and our design may be compared to some price-competition experiments. Our study overlaps with Dufwenberg and Gneezy (2000) on the full information treatment, and the results should be viewed as complementary. Both studies deal with the same game and use the random-matching setup, but the investigation proceeds along different dimensions, as Dufwenberg and Gneezy (given full information) consider the case of more than two competitors. It is shown that bids come

[1] Two comments about this game and its solution: (i) in a finite two-player game, a strategy is rationalizable iff it survives iterated elimination of strictly dominated strategies. If for each player a unique strategy does so, the corresponding profile must be the game's unique Nash equilibrium, which furthermore is strict. In our game, a bid of 100 is strictly dominated by a mixed strategy giving almost all weight to 99, and very low, but positive weight to 2. Repeated analogous arguments reveal that 2 is the unique strategy surviving iterated elimination of strictly dominated strategies, and the desired conclusions follow; (ii) we do not include (the per se reasonable) choices 0 and 1 in the strategy sets since this would eliminate the uniqueness of the theoretical prediction while (in terms of economic intuition) little would change (all equilibria entail small profits).

close to the Nash equilibrium when the number of competitors is three or four, but that bids remain much higher when only two competitors are matched. See Baye and Morgan (1999) for an analysis of how these results may be accounted for theoretically. Our old results on market concentration and our new results on the role of information feedback may be combined to yield insights about optimal auction design.

The random-matching setup used here and in Dufwenberg and Gneezy distinguishes these studies crucially from most other experimental studies of price-competition, because the usual approach is to consider repeated interaction among a fixed group of competitors. In such a setting, informational issues of various kinds (e.g. information about cost structures or signals of future prices) have been investigated, but not the effect of information about historic strategic choices. The classic contribution is Fouraker and Siegel (1963), and a collection of relevant other references include Dolbear et al. (1968), Selten and Berg (1970), Hoggatt et al. (1976), Friedman and Hoggatt (1980), Grether and Plott (1984), Holt and Davis (1990), Cason (1994, 1995), Cason and Davis (1995), Mason and Phillips (1997), and Gneezy and Nagel (1999). For overviews of some of the literature mentioned here, see Plott (1982, 1989) and Holt (1995). Three other studies of somewhat related games which, however, are not conceptualized as price-competition games are Nagel (1995) (the guessing game), Capra et al. (1999) (the travelers' dilemma), and Rapoport and Amaldoss (2000) (an (R&D) investment game). The two last studies involve random-matching.

In the next section, we describe the experimental procedure. Section 3 reports the results. Section 4 contains a discussion, where we describe a signaling phenomenon that may be important for explaining the results and close the paper by including a recommendation concerning optimal auction design.

2. Experimental procedure

The experiment was conducted at Tilburg University. Students were recruited using an advertisement in the university newspaper as well as posters on campus. The experiment consisted of three treatments with two sessions per treatment. There were 12 bidders in each of the six sessions. In each period, six pairs of participants were formed according to a random-matching scheme. Each session had 10 periods.

In treatment F (full information feedback), participants were informed at the end of each period about the entire bid vector (i.e. about all 12 bids). In treatment S (semi-full information feedback), only the vector of winning bids were communicated to the participants. In treatment N (no information feedback), participants were informed only about their personal payoff at the end of the period.

In each session, students received a standard-type introduction and were told that they would be paid 7.5 Dutch guilders (*f*7.5) for showing up.[2] Then, they took an envelope at random from a box which contained 13 envelopes. Twelve of the envelopes contained numbers (A1, ..., A12). These numbers were called "registration numbers". One envelope was labeled "Monitor", and determined who was the person who assisted us and checked

[2] At the time of the experiment, US\$1 $= f1.7$.

that we did not cheat.[3] We asked the participants not to show their registration number to the other students.

Each participant then received the instructions for the experiment (see Appendix A), and ten coupons numbered 1, 2, ..., 10. After reading the instructions and asking questions (privately), each participant was asked to fill out the first coupon with her registration number and bid for period 1. The bids had to be between 2 and 100 "points", inclusive, with 100 points being worth *f* 5. Participants were asked to fold the coupon, and put it in a box carried by the assistant. The assistant randomly took two coupons out of the box and gave them to the experimenter. In treatment F (sessions F1 and F2), the experimenter announced the registration number on each of the two coupons and the respective bids. If one bid was larger than the other, the experimenter announced that the low bid won the same amount of points as she bid, and the other bidder won 0 points. If the bids were equal the experimenter announced a tie, and said that each bidder won one-half of the bid. The assistant wrote this on a blackboard such that all the participants could see it for the rest of the experiment. Then the assistant took out another two coupons randomly, the experimenter announced their content, and the assistant wrote it on the blackboard. The same procedure was carried out for all the 12 coupons. All subsequent periods were conducted the same way; after period 10 payoffs were summed up, and participants were paid privately.

Treatment S (sessions S1 and S2) was carried out the same way, except that the experimenter did not announce the losing bids. Treatment N (sessions N1 and N2), was carried out the same way, except that the experimenter did not announce bids at all (and hence, only communicated the registration number(s) corresponding to the lowest bid for each matched pair).

3. Experimental results

The data from the respective sessions are presented in Table 1, in which the average winning bids and the average bids are also presented. Correspondingly, the average winning bids and the average bids are plotted in Fig. 1a–f. We start by describing the behavior in period 1, at which stage no elements of learning or experience exist. From observation of the data, it is clearly seen that the outcome predicted by theory was not achieved in this period.

The average bid (winning bid) was 33.5 (29.7) and 41.8 (23) in sessions 1F and 2F, respectively, 31.5 (25.5) and 40.9 (28.0) in sessions 1S and 2S, respectively, and 39.7 (21.0) and 42.6 (35.3) in sessions 1N and 2N. We perform a statistical test of whether the bids in different sessions came from the same distribution. To this end, we consider each of the (15) possible pairs of sessions, and investigate whether the two relevant sets of observed bids come from the same distribution. We use the non-parametric Mann–Whitney *U*-test based on ranks, and cannot, for any pair, reject (at a 5 percent significance level) the hypothesis that the observations comes from the same distribution (see Table 2). In this sense, in period 1 the different rules in the different markets did not influence behavior.

When comparing the development of bids in later periods, however, we see a great difference between treatments. Fig. 2 illustrates the average winning bids in the three treatments. In session 1F, we see a slow decrease of the average winning bid from 29.7 in period 1 to

[3] That person was paid the average of all other subjects participating in that session.

Table 1
The bids in the different sessions

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10
Bids in session F1 (full information feedback)										
A1	49	34	24*	22*	16*	15*	100*	100	60	20*
A2	15*	20*	25*	20	19	19	14*	9*	19*	19*
A3	39	39	30	35	40	19	100*	99	99	99
A4	40*	29*	28*	26	18*	16*	13*	80*	40	28*
A5	10*	20*	29	24*	19*	15*	14	100	79	79
A6	40*	30*	26	20*	21	15*	14*	19*	50*	60*
A7	23*	29	31*	24*	28	20*	14*	17*	40*	50
A8	46	32	24*	26	18*	100	20	35	88	66
A9	40	38	25*	25	20*	20	15	40	100	40*
A10	40*	40	35	19*	19*	18	40	39	35*	60*
A11	20	25*	20*	19*	17*	15*	12*	12*	20*	39
A12	40*	35*	30	23*	25	16	14*	18*	39*	35
Average bid	33.5	30.9	27.3	23.6	21.7	24.0	30.8	47.3	55.8	49.6
Average win bid	29.7	26.5	25.3	22.0	18.1	16.0	35.1	25.8	33.8	37.8
Bids in session F2 (full information feedback)										
A1	66	50*	33*	66	44	85	98	96	50*	99
A2	30	24*	33*	22	30*	20	79	50*	54	40
A3	80	70	39	39	19	26	59*	69	67	46
A4	40*	50	40	20*	20*	80	79*	76	66	42
A5	85	85	85	20*	20	15*	20*	70	70	50
A6	22*	28*	18*	18*	28	20*	30*	49	48	39*
A7	98	40	84	85	99	99	99	99	99	99
A8	20*	30	28	20*	18*	80*	20	40*	40*	30*
A9	5	17*	20*	17*	17*	16*	13*	19*	35*	39*
A10	33*	29*	27*	26	17*	16	79*	49*	48*	38*
A11	21*	21	21	21	18*	16*	39	69*	48*	68*
A12	2*	2*	2*	2*	2*	2*	2*	2*	2*	2*
Average bid	41.8	37.2	35.8	29.7	27.7	39.6	51.4	57.3	52.3	49.3
Average win bid	23.0	25.0	22.0	16.2	17.4	24.8	40.3	38.2	37.2	36.0

Table 1 (*Continued*)

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8	Round 9	Round 10
Bids in session S1 (semi-information feedback)										
A1	40*	35	25	15	9*	15	5	20	50	50
A2	47	27*	13*	12	9*	7*	3*	3*	3	2*
A3	22*	27*	22	12*	11	10	8	6*	4*	2*
A4	15*	24	15*	18	11	9*	7	15	2*	14*
A5	19*	19	17*	9*	9*	7*	5*	4*	2*	2*
A6	37*	18*	17	12*	9	7*	5*	3*	2*	2
A7	48	27*	25	14*	48	40	48	48	48	38
A8	21	15*	17*	15	11*	8*	8*	5*	5	4*
A9	25	25	13*	13	8*	8*	6*	5	4*	2*
A10	40	19*	18	10*	9*	8	6	5	3*	2*
A11	20*	15*	10*	10*	10	10	5*	2*	2*	2*
A12	44	28	25	16	11	8*	8	28	6*	20
Average bid	31.5	23.3	18.1	13.0	12.9	11.4	9.5	12.0	10.9	11.7
Average win bid	25.5	21.1	14.2	11.2	9.2	7.7	5.3	3.8	3.1	3.8
Bids in session S2 (semi-information feedback)										
A1	24*	39*	24*	19*	24	16	12*	9*	9	4
A2	75	50	75	25*	25	20	15	10*	10	99
A3	40	40	20	30	15*	15*	15	10*	8	4*
A4	28*	12*	21*	29	19	13*	11*	8*	10*	3
A5	49*	45	48	20*	19*	19*	13*	18	8	2*
A6	66	20*	35	20	16*	15	30	10	7*	20
A7	80	60	25*	28	22	14*	19	19	100	20*
A8	13*	45	19*	20*	22*	21	18*	10*	9	5*
A9	22	20	18*	23*	18*	15*	12*	11	7*	5
A10	25*	21*	30	20*	19	10*	14	10*	8*	5
A11	40	23*	24	24	15*	15*	14*	12*	7*	4*
A12	29*	39*	34*	23	17*	42	22	19	7*	2*
Average bid	40.9	34.5	31.1	23.4	19.3	17.9	16.3	12.2	15.8	14.4
Average win bid	28.0	25.7	23.5	21.2	17.4	14.4	13.3	9.9	7.7	6.2

Bids in session N1 (no information feedback)										
A1	100	100	100	100	100	100	100	100	100	100
A2	35	50	95	20*	30	20	90	30*	80	80
A3	100	50	50	25*	25	25	20	10	20*	10*
A4	35*	30*	35	25	20*	20*	20*	15*	25	15
A5	30	25	10*	14*	19*	24*	24*	24*	24	14*
A6	23*	23*	23*	23*	23	23	2	2*	2*	2*
A7	2*	100	2*	100	2*	100	2	2*	2*	2*
A8	29*	29*	29*	50	29*	29*	29*	29	15	39
A9	12*	14*	17*	22*	35	32	25	25*	20	10
A10	25*	25*	40	30	20*	20*	20*	20	5*	5*
A11	60	49	20	20*	20*	18*	18*	18*	10*	10*
A12	25	10*	20*	20	15*	15*	10*	10	10*	5*
Average bid	39.7	42.1	36.8	37.4	28.2	35.5	30.0	23.8	26.1	24.3
Average win bid	21.0	21.8	16.8	20.7	17.9	21.0	20.2	16.6	8.2	6.9
Bids in session N2 (no information feedback)										
A1	100	100	50	25	10*	10*	20*	50	20	20
A2	29*	19*	11*	9*	7	5*	4	9*	7*	9*
A3	21	98	99	2*	2*	2*	2*	2*	2*	2*
A4	45	25*	35	50	25	30	25	20	2*	20
A5	39*	27*	18*	13*	11*	9	3*	4*	20	2*
A6	25*	35*	40	40	30*	30	30	20	20	20
A7	46*	46	35*	40	33	24	15*	20	15*	20
A8	10*	10*	10*	10*	5*	10*	10*	10*	10*	10*
A9	49*	48	39	20	10*	6*	7	5*	5	5*
A10	49*	49	46*	42*	41	49	30	70	30	25
A11	29	20*	24*	27*	21	23	19	17*	22	30
A12	69	37	25	15	8*	10*	8*	10	8*	10*
Average bid	42.6	42.8	36.0	24.4	16.9	17.3	14.4	19.8	13.4	14.4
Average win bid	35.3	22.7	24.0	17.2	10.9	7.2	9.7	7.8	7.3	6.3

* Indicates a winning bid.

16 in period 6. From period 6 to 7, a jump in the average winning bid from 16 to 35.1 is observed. From this point on the averages are 25.8 in period 8, 33.8 in period 9, and finally 37.8 in period 10. It is clear that no tendency of convergence towards bids of 2 is observed. In fact, the smallest bid in period 10 was 19. In session 2F, the average winning bid decreased constantly from 23 in period 1 to 16.2 in period 4. Then, however, the average winning

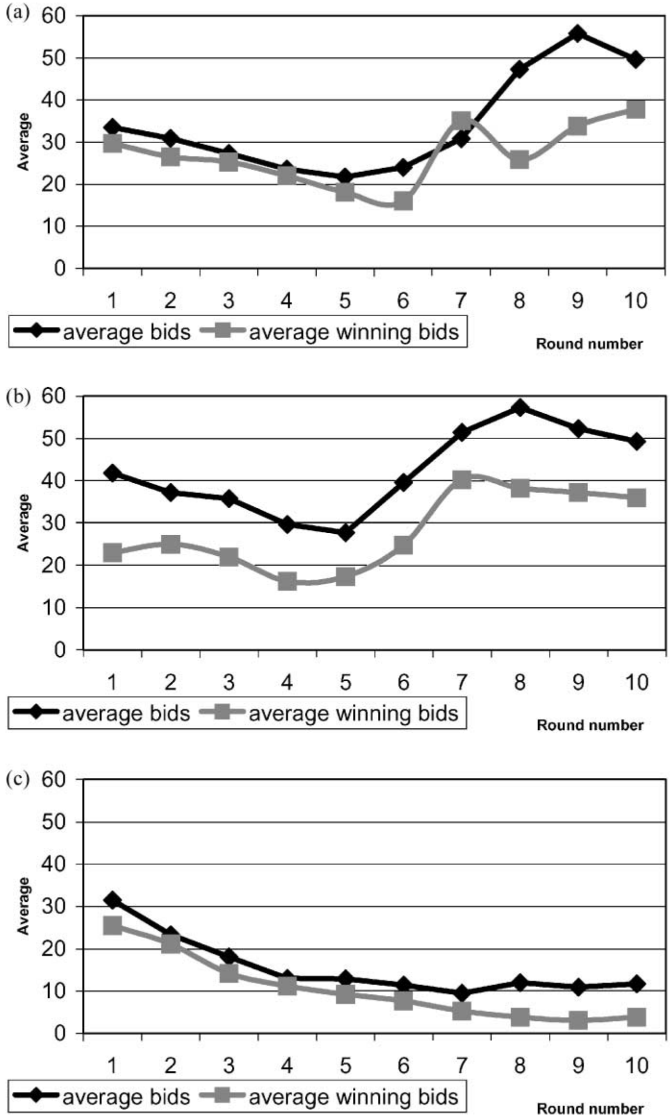

Fig. 1. (a) Average bids and winning bids, session F1; (b) average bids and winning bids, session F2; (c) average bids and winning bids, session S1; (d) average bids and winning bids, session S2; (e) average bids and winning bids, session N1; and (f) average bids and winning bids, session N2.

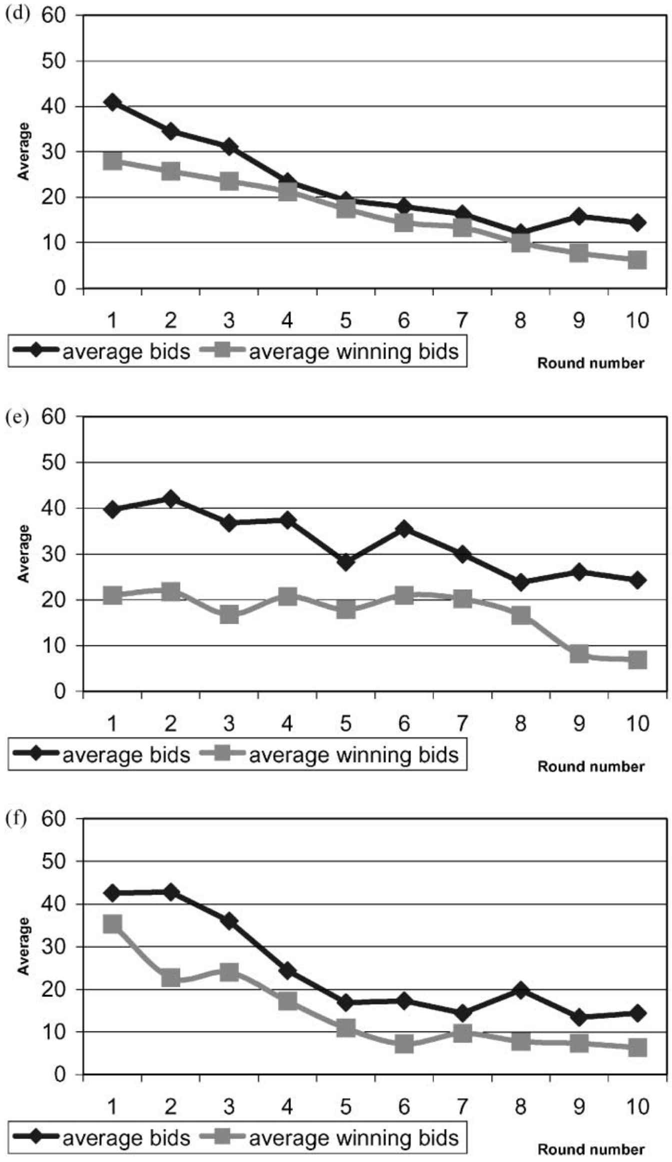

Fig. 1. (*Continued*).

bid started to rise, and in periods 8–10, the average winning bids were 38.2, 37.2, and 36, respectively. An interesting observation is that participant number A12 in this session used a constant bid of 2 throughout the experiment. Of course, this bid of 2 was "strange" given the fact that the next-lowest bid in period 10 was 38. This bid was not enough to move the other bids to the neighborhood of 2. Furthermore, the bids in both sessions of treatment F

Table 2
A pairwise comparison of bids in the first period across sessions using Mann–Whitney *U*-test based on ranks[a]

	Session F2	Session S1	Session S2	Session N1	Session N2
Session F1	0.00 (1.000)	0.29 (0.7728)	−0.61 (0.5444)	0.43 (0.6650)	−0.89 (0.3708)
Session F2		0.38 (0.7075)	−0.26 (0.7950)	−0.12 (0.9081)	−0.49 (0.6236)
Session S1			−1.10 (0.2727)	−0.23 (0.8179)	−1.39 (0.1659)
Session S2				0.38 (0.7075)	−0.26 (0.7950)
Session N1					−0.69 (0.4884)

[a] The null hypothesis is that all bid vectors come from the same distribution. The numbers in the cells are the z-statistics. The probability $> |z|$ is given in brackets.

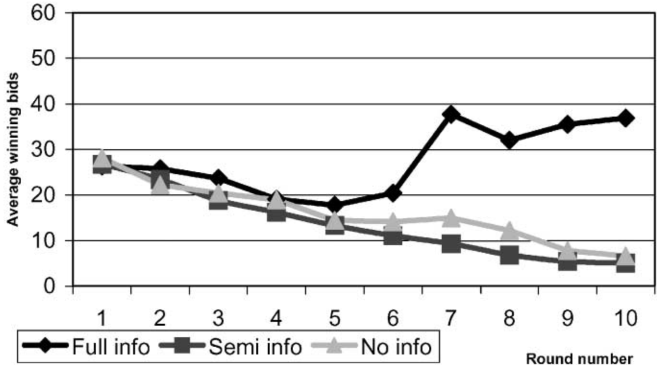

Fig. 2. Average winning bids.

were much alike in period 10; the average bids were 49.6 and 49.3 in sessions 1F and 2F, respectively, and the average winning bids were 37.8 and 36 in the respective sessions.[4]

In session 1S, we see a decrease in the average winning bid from 25.5 in period 1 to 3.8 in period 10. Bids decrease steadily moving from period 1 to period 10. The lowest bid (as well as the median bid) in period 10 is 2. A similar behavior is observed in session 2S, in which the average winning bid decreased from 28.0 in period 1 to 6.2 in period 10. The lowest bid in period 10 was also 2, with 9 out of the 12 participants bidding 5 or less. When comparing the two sessions of treatment S we see that, as in the case of treatment F, the bids in both sessions were quite similar in period 10.

In session 1N, we see that the decrease in the average winning bid is not monotonic. The average winning bid fluctuates around its starting value (21) until the seventh period, and only then does it start to decline. The average winning bid in the final period is 6.9, and the median bid is 10 (as compared with a median bid of 29.5 in period 1). In session 2N the decrease in the average winning bid is more steady (though not monotonic), from 35.3 in period 1 to 6.3 in the final period.

Fig. 3 presents cumulative distributions of the bids chosen in period 10 for each treatment, aggregated across the two sessions for each treatment.

[4] Unlike the case of first round behavior, it is not appropriate to use the Mann–Whitney *U*-test, because the assumption that all observations are independent is not justified.

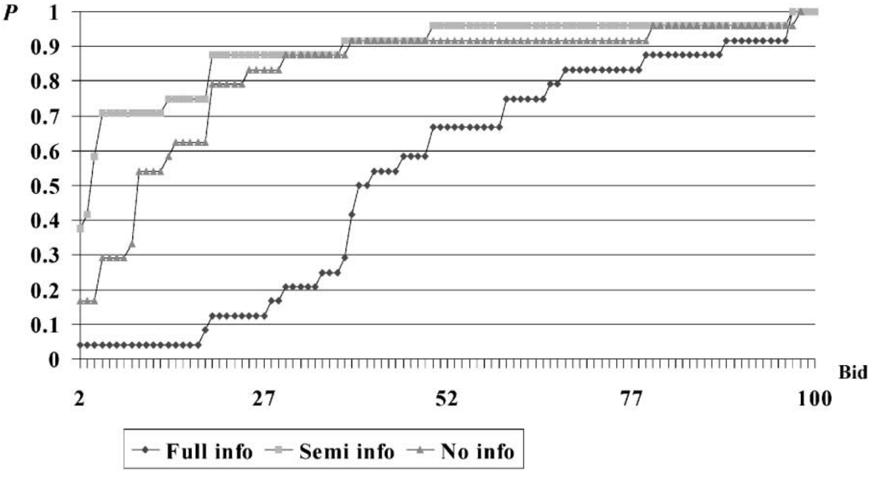

Fig. 3. The c.d.f. for the three treatments.

To summarize, the market outcomes in period 1 are similar across treatments, and behavior is far from the equilibrium prediction. The market outcomes in the final periods differ dramatically between the full information treatment and the other two treatments. Nearly all bids in the full-information sessions are far from equilibrium, while all winning bids in the other two treatments are relatively close to the equilibrium.

4. Discussion

In this paper we consider the design of auctions by an auctioneer who may seem to have very little power: the auctioneer can only decide how much information feedback to give to the bidders in the auction. [5] The bidders compete in an environment with recurrent competition. The theoretical prediction is unambiguous regarding all the three possible degrees of information disclosure: each bidder should submit the lowest bid possible.

Yet, when we test this model experimentally, bidders in the initial period choose bids higher than in the Nash equilibrium. However, bids rapidly moved in the direction of the theoretical prediction in two out of the three treatments. This occurred when each bidder either received information only about her own performance in previous periods or when each bidder received information feedback only about her own performance and about the winning bids of the previous periods. However, in a third treatment, in which the bidders were informed about the entire bid vector in previous periods, bids remained much higher than the theoretical prediction.

[5] By contrast, the theoretical literature on optimal auction design typically considers the effects of different mechanisms (e.g. Luton and McAfee, 1986; Laffont and Tirole, 1987; Piccione and Tan, 1996) or market structures (e.g. Dana and Spier, 1994; McGuire and Riordan, 1995), but does not address the issue of information feedback in recurrent interaction.

Apparently, the information about the losing bids is of great importance for the competitors. This result may be explained in terms of signaling behavior. The following intuitive argument is intended to be suggestive of the process: assume each bidder has two possible actions in time t (when t is not the final period). The bidder can either "compete" or "signal". If the bidder chooses to compete, then she submits a bid which gives the highest expected reward at time t, based on the bidder's belief about the behavior of the competing bidders. Alternatively, the bidder may choose to use her bid at time t to signal. Doing that, the bidder makes a conspicuously "high" bid at time t, sacrificing payoffs in that period in order to influence the beliefs of the other bidders in time $t + 1$. If the bidder is successful in doing this, then (s)he may expect a higher payoff at time $t + 1$ than if (s)he chooses to compete at time t.[6] Clearly, this kind of signaling may be profitable only when the other bidders can observe the signals. That is, the bidders will only be aware of signals in the treatment in which observe the entire bid vector.

Note that if this signaling story is relevant, the trade-off between profits in the current period and overall profits may favor signals when bids at time t are expected to be very low. Moreover, in the current random-matching context, this signaling explanation is not the same as the repeated interaction explanation in which competitors are assumed to collude. To construct a formal model of signaling may be a feasible research task which could shed some light on how bids evolve in auctions over time, or on how prices evolve in markets in which firms compete in prices. We hope that the findings we report in this study will serve to inspire such a line of inquiry. This, however, lies outside the scope of the present paper.

What have we learned of relevance for optimal auction design? A fairly clear picture emerges if we first refer to the results of Dufwenberg and Gneezy (2000), which concern the same game as here except that more than two competitors may interact. That study may be interpreted as suggesting that auctioneers are well-advised to try to have at least three bidders competing; with only two competitors, bids remained from the Nash equilibrium, while bids approached the equilibrium when the number of bidders was three or four. However, this result, was derived under conditions of full information about historic bids. The present paper shows that, even with two competitors, bids come close to the Nash equilibrium if information about losing bids is not disclosed. Based on this observation, we now venture upon the following piece of advice to auctioneers: *you may announce winning bids, but keep the losing bids secret*!

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[6] In the context price competition experiments, observations of related kinds of signals are made by Fouraker and Siegel (1963, pp. 185–188), Hoggatt et al. (1976), and Friedman and Hoggatt (1980) for the case of repeated interaction among a fixed group of firms. See Plott (1982, pp. 1513–1517) for a discussion. Surprisingly, these interesting observations seem to have been "forgotten"; we have seen no post-1982 discussion of the matter in the literature.

started this research while we were both at the CentER for Economic Research at Tilburg University, and completed it during a visit of Uri Gneezy to Stockholm University.

Appendix A. Instructions for the full information treatment

In the following game, which will be played for 10 rounds, we use "points" to reward you. At the end of the experiment we will pay you 5 cents for each point you won (100 points equals 5 Dutch guilders). In each round, your reward will depend on your choice, as well as the choice made by one other person in this room. However, in each round you will not know the identity of this person and you will not learn this subsequently.

At the beginning of round 1, you are asked to choose a number between 2 and 100, and then to write your choice on card number 1 (please note that the 10 cards you have are numbered 1, 2, ..., 10). Write also your registration number on this card. Then we will collect all the cards of round 1 from the students in the room and put them in a box.

The monitor will then randomly take two cards out of the box. The numbers on the two cards will be compared. If one student chose a lower number than the other student, then the student that chose the lowest number will win points equal to the number he/she chose. The other student will get no points for this round. If the two cards have the same number, then each student gets points equal to half the number chosen. The monitor will then announce (on a blackboard) the registration number of each student in the pair that was matched, and indicate which of these students chose the lower number and what his/her number was.

Then the monitor will take out of the box another two cards without looking, compare them, reward the students, and make an announcement, all as described above. This procedure will be repeated for all the cards in the box. That will end round 1, and then round 2 will begin. The same procedure will be used for all 10 rounds.

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